RECEIVER IN AN ANTENNA BASE

Background Information

Field of the Invention

The present invention relates to a receiver, in particular a radio receiver for installation in a motor vehicle, whose tuner connected to an antenna is spatially separated from other receiver components, and ~~from~~ a tuner for a radio receiver ~~according to the preamble of the independent claims.~~

Background Information

German Patent Application No. 43 03 110 A1 describes a radio receiver system having an antenna amplifier, a tuner and a low-frequency part. To avoid running an antenna cable from the antenna amplifier, i.e., the antenna, to the tuner, which is usually complicated, and to reduce interference of the received high-frequency radio signal susceptible to interference while it is being transmitted via the antenna cable, it is proposed that the customary link containing a tuner and low-frequency amplifier be replaced by a direct spatial link of the antenna amplifier and the tuner to a switching module and that this unit be placed at a suitable location within the car body.

~~Advantages of the Invention~~

Summary of the Invention

The receiver according to the present invention ~~having the features of the main claim~~ has the advantage over the related art that the antenna cable between the antenna and the antenna amplifier is no longer needed due to the spatial link of the tuner of a (radio) receiver including the tuner component and the antenna. Thus the sensitivity of the received radio signal to stray interference is reduced in

comparison with the related art.

By integrating the tuner into the antenna base, it is no longer necessary, in the case of a (radio) receiver intended for installation in a motor vehicle, to look for a suitable location for the installation of the tuner or to install it at the suitable location, which is often difficult.

Another advantage is that the tuner can be integrated, via at least one terminal for control data and/or useful data, into a complex communication network in the vehicle, which may contain, in addition to the components of a conventional radio receiver, other external components such as, for example, a compact disc player or a receiver for GPS signals.

Relocation of the tuner including the tuner component in the antenna base frees up space for other functions or components in the operator control, which is designed as an interface between the user and the communication network.

Advantageous refinements of and improvements on the receiver and tuner according to the present invention are possible as a result of the features described in the subclaims.

Thus, it is advantageous if the tuner is connected to the operator control and other components via the terminal for control data. If the system is properly wired for useful data, such as audio data, signals of different audio sources can be used in parallel at the same time at different positions in the vehicle.

By spatially separating the tuner from the operator control

and the other receiver components, the danger of severe mutual interference of the tuner and the processors in the operator control system is reduced.

Drawing

Exemplary embodiments of the present invention are illustrated in the drawing and elucidated in greater detail in the description that follows.

Figure 1 shows an antenna with a receiver tuner arranged in its base;
Figure 2 shows a block diagram of the tuner including the tuner components arranged in the base of the antenna; and
Figure 3 shows the interconnected components in a motor vehicle.

Detailed Description of the Embodiment

Figure 1 shows an antenna 2 using the example of a vehicle antenna usually located on the roof of a vehicle in the form of a short-rod antenna. It has a base 3, which is in direct contact with sheet metal 8 of the vehicle body. In contrast, in another exemplary embodiment of the present invention, base 3 of antenna 2 is arranged under the sheet metal of the body and only antenna 2 itself protrudes outward through the sheet metal.

A tuner 1 for a radio receiver installed in the motor vehicle is arranged in base 3 of antenna 2, with tuner 1 in the present embodiment being detachably connected to antenna 2 and to antenna base 3 for the purpose of easier repair or

replacement of one of the components (antenna / tuner).

Tuner 1 has a power supply terminal 7, a terminal 5 for control data and a second terminal 6 for useful data, each of which in the present case are guided through into the vehicle interior in the form of lines through bores in the sheet metal of the body.

Figure 2 shows the circuit of tuner 1, which is connected to antenna 2. The output of antenna 2 is in contact with the input of a pre-amplifier 10 for the high-frequency received signals, in the case of a radio receiver for the received radio signals. The output of pre-amplifier 10 is connected to receiver circuit 11, hereinafter also referred to as tuner component 11. The output of receiver circuit 11 is connected to an encoding circuit 12, which is in turn connected to an interface circuit 15, whose output corresponds to second terminal 6 for useful data. Receiver circuit 11 has an additional connection to a microcontroller 14, which is in turn connected to a bus interface 13.

In tuner 1 according to the present invention, microcontroller 14 takes over all control functions so that, for example, commands issued by operator control 20 of the radio receiver, such as a change of broadcasting station, for example, are translated into appropriate control signals for tuning the tuner to another transmission frequency.

Bus interface 13 has a terminal 5 for control data. The high-frequency antenna signal received by antenna 2 is amplified in pre-amplifier 10 and sent to receiver circuit 11. The latter makes the received signal available in a standard format, which is converted in a downstream encoder

circuit 12 into a format suitable for transmission over greater distances. Such a format, which is suitable for transmission over several meters, for example, the distance between the antenna including the tuner and the data sink, is, for example, given by IEC 958. Before the signal is transmitted via data line 26 connected to second terminal 6 for useful signals, it is adjusted to the conditions of the transmission link in interface circuit 15. Data can be transmitted over data line 26 either via shielded cables or via fiber optic lines, for example. In either case, an interface circuit 15 is required. In the first case, galvanic isolation must take place in the circuit; in the second case the electric signal must be converted into an optical signal. Tuner 1, i.e., the receiver circuit 11 in particular, is controlled via a bus interface 13 and microcontroller 14. Receiver circuit 11 is activated via control line 25, which is connected to terminal 5 of tuner 1 for control data, for example, when the user desires to receive radio data.

Figure 3 shows a simple example of the communication network in a motor vehicle, including operator control 20 of the receiver, tuner 1 of the receiver, other components 21 of the receiver, such as the low-frequency amplifier for amplifying the audio signals to be reproduced or a display unit for displaying, for example, the name of a radio station being received, as well as, optionally, external components 22, connected to the receiver and/or to the communication network, such as, for example, a compact disc player, an additional low-frequency amplifier for amplifying audio data to be reproduced, or a receiver for receiving positioning data received via the GPS (Global Positioning System), or a navigation system.

Operator control 20 is connected to all the active components via data lines 26. Control output and/or control input of operator control 20 is connected to the control line or control and monitoring bus 25, which in turn has a terminal at the inputs/outputs of all other components 21 of the receiver and optionally of external components 22 connected to the receiver, i.e., the tuner. The component including tuner 1 and antenna 2 is also connected to control line 25 and data line 26.

Operator control 20 is used by the user to operate the communication network. It can be installed in the conventional position for a car radio, with it being capable of accommodating the functions of individual components. Operator control 20 can be configured as a pure operator control or may also have additional functions such as a GSM telephone. However, a mobile telephone transceiver and also, for example, a GPS receiver for receiving navigation data transmitted via the Global Positioning System (GPS), together with tuner 1 or as a part thereof can also be integrated in base 3 of antenna 2 within the scope of the present invention.

All other components 1, 21 of the receiver installed in the vehicle and external components 22 connected to the communication network are addressed via operator control 20 and the control line or control bus 25.

According to a refinement of the present invention, control data and useful data such as, for example, audio data can be transmitted via a common medium such as a copper cable or optic fibers, both control data and useful data accessing one and the same bus. If the user wishes to listen to the

radio in the front area of the vehicle, while the signals of other audio sources are to be output in the rear of the vehicle, this can be achieved without difficulty. The user issues a command to the tuner 1/antenna 2 combination to activate reception. The radio data are transmitted to a data sink, which is suitable for outputting data in the front area of the vehicle. At the same time, operator control 20 can activate a compact disc player, for example, and output its data flow to a second data sink, for example, a speaker located in the rear of the vehicle or a headset.